

Periodic Research

Crop-Combination in Kushinagar-A Way for Development

Abstract

In India, most of the livelihood depends on agriculture and agricultural products, ultimately on primary activities. Researchers' think that Agriculture sector is a sector of backwardness, so the regions comprehensively related to Agriculture treated as Backward Areas; it is unfortunate part of academia. Kushinagar district in such a way treated as backward area. and so, Ministry of Panchayati Raj declares it as the 250th backward districts among the 640 districts across the country. The backwardness of this district is not its agricultural base; but the behavior, behaved with this district by the Government as well as the residents of the district. In this study, it has been examined the crop-combination structure and the impact of that on the developmental process of the District. For this purpose, we have used primary data and analyzed here in this research paper. The study of crop combination regions constitutes an important aspect of agricultural geography as it provides a good basis for agricultural regionalization. The crops are generally grown in combinations and it is rarely that a particular crop occupies a position of total isolation other crops in a given area unit at a given point of time.

Keywords: Livelihood, Crop-Combination, Agrarian, Crop-Rotation, Land-Efficiency, Agricultural - Production, Land - Behaviour, Land-Utilization, Agrarian-Society, Agricultural - Land, Net Cropped Area, Total Cropped Area, Productivity

Introduction

It constitutes significant aspect of agricultural geography as it forms the basic philosophy integrated regional planning in subsistence agrarian society. Combination is the result of Agricultural behavior of the farmers' society. Basically there are no difference between Crop-Combination and Crop-Rotation; when rotation runs for combinational rotation of the crops, but literally productivity word is more acceptable than efficiency. The term Crop-Combination widely used, but defined in many ways. Despite many approaches has been adopted by agricultural economists and geographers. It is widely accepted that the CC is the function of land, labour, agricultural needs and capital.

Some of these experts quite often consider these factors separately for measuring the CC status in a particular area or region. Very commonly used connotation is that CC is some of the total factor of productivity, which relates total inputs to total outputs. It can say another words that the ratio of the index of total agricultural output to total input used in the farm production. Various methods are still in common tradition for the study of Crop-Combination. Kostrowic analyze the ideas and find the conclusion that Crop-Combination must be studied on different levels and he further said in this conclusion that 'crop-combination, per labour production, land- efficiency, land- behavior and land- utilization etc. should be studied separately, then conclusive productivity of a particular agricultural area should be studied'.

Review of Literature

According to James PI & Jonce CF 'regional characteristics cannot be understand without the study of Crop Combination (CC) and concrete agricultural regionalization will also be very crunch without the study of CC. On the basis of production of different crops in an area and different crops in different areas, produces the concept CC. CC does not come suddenly in an area. It is the consequent process of Physio-socio-cultural-economic and other elements. When one has to start the study of Crop-Combination, it is necessary to understand the idea of Crop-Combination planning and the basics behind that. James PI & Jonce CF



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has said that 'regional difference in Crop-Combination is the sum of climatic, physical condition and need of the agrarian society.

According to Singh BB, "Crop-Combination expresses the varying relationship between agricultural output and one of the major inputs like-land or labour or capital, other complementary factors remaining the same". Here it may be borne in mind, that combination is physical rather than a value concept. In the twenty third annual session of Indian Society of Agricultural Economics (ISAE), there were ideas stands –

1. Crop-Combination means, minimum three crops simultaneously produces in a particular agricultural land.
2. Crop-Combination must be studied with the help of all the related factors like- land, labour, agricultural need and capital etc.
3. Crop-Combination must be calculated with the help of factor related to land- efficiency, land-behavior and land- utilization.

In ISAE, the idea of per acre production after proper crop-combination was most powerful, thus it has been accepted. In the same session Pandit AD has said in their conclusion that 'combination is defined in economics as the output of per unit input'. Increase in output from the same input or getting the same output from a smaller input. Prof Kostrowic's idea is the dominant idea in this field. He asked the ideas of hundreds of agricultural scholars from different countries, in which fifty scholars send their ideas.

Objective of the Study

Agriculture is the backbone of the Indian economy as well as the agrarian society. The agrarian society in India mostly uses multi-cropping agriculture at a given time span. It gives extra advantage to the agrarian people of India. This diversified and combinational structure of Agriculture varies across the country according to the geographical/climatic condition and situation as well. So, the study of crop-combination is necessary in a particular area, region or a district to know the exact agricultural input and output for the further economic condition depending on the primary activities like- agriculture. Considering this objective this study has gone through the different aspect of this crop-combination structure. In this regard this study has taken into account of a agriculture dominant area of the Eastern Uttar Pradesh for this calculation, observation and analysis.

Study Area

Padarauna is the district headquarters, situated in Uttar Pradesh, INDIA. The district is named as Kushinagar, Buddhist pilgrimage site where Gautam Buddha attained PARINIRVANA in the 6th or 5th centuries BC. Kushinagar situated at 52 kms East from Gorakhpur on the National Highway no. 28. The district lies between 26 degree 45 minute N and 83 degree 24 minute E. Padrauna is 71 kms from Gorakhpur and 336 kms from Lucknow. It is a Tarai area covering the geographical area of 2873.5 Sq. km. It is bounded by districts- Mahrajganj in the west, Gorakhpur in the southern-west, Deoria in the south

and Bihar state in the east. Geographically this region may be called as region; because of the different dimensions of the Gandak river, her tributaries and the different names and identity of the Gandak river. Fig.01.

According to the 2011 census Kushinagar district has a population of 3560830, roughly equal to the nation of Lithuania or the US state of Connecticut. This gives it a ranking of 81st in India (out of a total of 640). The district has a population density of 1,226 in habitants per square kilometer. Its population growth rate over the decade 2001-2011 was 23.08 percent. Kushinagar has a sex ratio of 955 females for every 1000 males and a literacy rate of 67.66 percent. Total area of the district is 2873.5 square km. The urban population is 4.87 percent. In 2006 the Ministry of Panchayati Raj named Kushinagar one of the country's 250 most backward districts (out of a total of 640). It is one of the 34 districts in Uttar Pradesh currently receiving funds from the Backward Regions Grant Fund Programme (BRGFP). Government of India has approved a project for the construction of an international airport here.

Methodology

The studies related to Crop-Combination, advocated by eminent scholars have been taken into account for measuring comparable CC as well as the impact of CC in agriculture sector in this area. The efforts to promote agricultural production both by intensive and extensive methods assure greater significance in order to keep pace will the growing population. Intensive cropping assumes priority as compared to the extension of cultivable land as it has got meager scale almost everywhere. The intensive cropping approach is feasible only through the adoption of new agricultural technology by providing priority to higher value cash/commercial crops. Chemicals and fertilizers presents negative role in this regard. Crop-Combination is the better way to fulfill the present need of hours.

Due to fast techno-economic changing situations, a more viable and appropriate measure for Crop-Combination is required to be attempted. In this regard it can be hypothesized that CC is the function of

1. Crop-Combination is the better utilization of agricultural land.
2. Crop-Combination is the best way to fulfill the requirement and demand of present day agricultural production.

It has been emphasized that the combined outcome of the two would certainly reflect the levels of CC in a region under existing socio-economic and micro-environmental conditions at a given point of time. The different methods applied in the delineation of crop combination regions can be summed up fewer than two headings.

1. The first method for the demarcation of crop combination regions is the arbitrary choice method, e.g., the first crop only, the first two crops only or the first three crops, etc. The crop combinations delineated on arbitrary choice

Periodic Research

method are, however, not rational and objective as by applying arbitration the rest of the crops grown in the area are irrationally excluded without any consideration of their percentage weight age in the total cropped area.

- The second method is developed in terms of variables based on certain differences which are relative and not absolute. This method being based on statistical approach is more accurate, reliable and scientific as it gives better objective grouping of crops of a region. The statistical techniques about crop combination have been modified suitably by the geographers from time to time.

Singh BB is the pioneer of this study in India. For the study of CC, first it is necessary to serialize the crops percentage area in descending order as real percent. If in an area only one crop produces on 100 per cent area, then that area is single cropped area (SCA) and in that area, there is no combination.

Formula for CC is

- For one specialized crop = $(100 - \text{first crop percentage area})^2 \div 1$
- For two CC region = $\{(50 - \text{first crop percentage})^2 + (50 - \text{second crop percentage})^2\} \div 2$

For two CC regions, 100 will be divided by 2 and crops area percentage will subtract from 50. For three CC regions, 100 will be divided by three and thus crops area percentage will subtract from 33.33 and so on for four, five CC etc.

Formula can be simply written as follows

$$= \sigma D^2 \div N$$

In which D^2 = percentage area of crop

N = number of crops

Discussion

In the case of Kushinagar region, Waivers' formula has been applied. Block wise different CC regions are as follow –

Percentage area of different crops in descending order is -

Motichak

Wheat 30.50, rice 28.30, sugarcane 18.90, pulses 8.50, oilseeds 7.30 and vegetables 6.50. This is the descending order of cropping percentage area and according to this the calculation of CC of Motichak block are as follows -

For one specialized crop = $(100 - 30.50) = (69.50)^2$	= $4830.25/1 = 4830.25$
For two CC = $(50 - 30.50)^2 + (50 - 28.30)^2 = 380.25 + 470.89$	= $851.14/2 = 425.57$
For three CC = $(33.33 - 30.50)^2 + (33.33 - 28.30)^2 + (33.33 - 18.90)^2$	= $241.53/3 = 80.81$
For four CC = $(25 - 30.50)^2 + (25 - 28.30)^2 + (25 - 18.90)^2 + (25 - 8.50)^2$	= $350.60/4 = 87.65$
For five CC = $(20 - 30.50)^2 + (20 - 28.30)^2 + (20 - 18.90)^2 + (20 - 8.50)^2 + (20 - 7.30)^2$	= $473.89/5 = 94.78$
For six CC = $(16.66 - 30.50)^2 + (16.66 - 28.30)^2 + (16.66 - 18.90)^2 + (16.66 - 8.50)^2 + (16.66 - 7.30)^2 + (16.66 - 6.50)^2$	= $589.49/6 = 98.25$

Values of different CCs in Motichak block are– 4830.25, 425.57, 80.81, 87.65, 94.78 and 98.25. The value of Three CC is lowest, so this block comes under Three CC regions.

According to above calculation different blocks CC is as follows

Sukrauli

Wheat 28.50, rice 28.00, sugarcane 18.90, pulses 9.60, oilseeds 7.80 and vegetables 7.20. This is the descending order of cropping percentage area and according to this the calculation of CC of Sukrauli block are as follows. Values of different CCs in Sukrauli block are– 5112.25, 473.13, 86.65, 73.91, 78.09 and 81.94. The value of Four CC is lowest, so this block comes under Four CC regions.

Hata

Wheat 29.71, rice 27.86, sugarcane 18.70, pulses 8.70, oilseeds 7.90 and vegetables 7.08. This is the descending order of cropping percentage area and according to this the calculation of CC of Hata block are as follows. Values of different CCs in Hata block are– 4940.68, 450.93, 85.69, 83.94, 86.37 and 88.63. The value of Four CC is lowest, so this block comes under Four CC regions.

Captanganj

Wheat 29.40, rice 26.80, sugarcane 20.50, pulses 8.50, oilseeds 7.50 and vegetables 7.30. This is the descending order of cropping percentage area and according to this the calculation of CC of Captanganj block are as follows. Values of different CCs in Captanganj block are– 4984.36, 481.30, 74.23, 78.78, 84.67, and 86.33. The value of Three CC is lowest, so this block comes under Three CC regions.

Ramkola

Wheat 32.80, rice 27.80, sugarcane 20.30, pulses 7.40, oilseeds 6.20 and vegetables 5.50. This is the descending order of cropping percentage area and according to this the calculation of CC of Ramkola block are as follows. Different CCs values in Ramkola block are – 4515.84, 394.34, 66.88, 100.13, 114.79 and 119.59. Lowest value among all the combinations is 66.88. Thus Ramkola is under Three CC regions.

Nebua Naurangiya

Wheat 29.40, rice 27.20, sugarcane 20.20, pulses 9.20, oilseeds 7.80 and vegetables 6.20. This is the descending order of cropping percentage area and according to this the calculation of CC of Nebua Naurangiya block are as follows. Nebua Naurangiya blocks' CCs values from one specialized crop to sixth CC are – 4984.36, 472.10, 75.14, 74.22, 81.14 and 88.25, lowest value is 74.22. Nebua Naurangiya is under Four CC regions.

Khaddha

Wheat 30.60, rice 27.90, sugarcane 19.20, pulses 8.50, oilseeds 7.20 and vegetables 6.60. This is the descending order of cropping percentage area and according to this the calculation of CC of Khaddha block are as follows. Khaddha blocks' CCs values from one specialized crop to sixth CC are – 4816.36, 432.39, 78.86, 86.42, 94.30 and 97.40, lowest value is 78.86. Nebua Naurangiya is under Three CC regions.

Periodic Research

Bishunpura

Wheat 27.40, rice 25.30, sugarcane 18.30, pulses 17.40, oilseeds 6.20 and vegetables 5.40. This is the descending order of cropping percentage area and according to this the calculation of CC of Bishunpura block are as follows. Crop combination values of different CCs are – 5270.76, 560.43, 108.52, 27.13, 56.59 and 71.57. In these values, Four CC value is lowest; therefore Bishunpura is under Four CC regions.

Padrauna

Wheat 27.00, rice 26.60, sugarcane 17.30, pulses 12.70, oilseeds 9.20 and vegetables 7.20. This is the descending order of cropping percentage area and according to this the calculation of CC of Padrauna block are as follows. Padrauna block CCs values are – 5329.00, 538.28, 114.13, 54.29, 53.96 and 61.16, Fifth CC value is lowest. So Padrauna is under five CC regions.

Kasia

Wheat 26.40, rice 24.30, sugarcane 18.20, pulses 12.00, oilseeds 10.10 and vegetables 9.00. This is the descending order of cropping percentage area and according to this the calculation of CC of Kasia block are as follows. Values of different CCs in Kasia block are – 5416.96, 608.73, 119.49, 54.42, 44.94 and 46.51. Five CC value is lowest, therefore Kasia is under Five CC regions.

Fazilnagar

Wheat 29.20, rice 27.20, sugarcane 16.50, pulses 10.50, oilseeds 9.20 and vegetables 7.40. This is the descending order of cropping percentage area and according to this the calculation of CC of Fazilnagar block are as follows. Fazilnagar block CCs values are – 5012.64, 476.24, 112.63, 76.25, 71.12 and 74.62. Fifth CC value is lowest. So Fazilnagar is under Five CC regions.

Tamkuhi

Wheat 28.20, rice 27.00, sugarcane 19.80, pulses 12.10, oilseeds 7.40 and vegetables 5.50. This is the descending order of cropping percentage area and according to this the calculation of CC of Tamkuhi block are as follows. Tamkuhi block CCs values from one to six are – 5155.24, 502.12, 83.15, 51.92, 67.49 and 80.17. The value of Four CC is lowest; thus Tamkuhi is under Four CC regions.

Dudhahi

Wheat 30.00, rice 28.20, sugarcane 17.40, pulses 9.40, oilseeds 8.20 and vegetables 6.80. This is the descending order of cropping percentage area and according to this the calculation of CC of Dudhahi block are as follows. Values of different CCs in Dudhahi block are – 4900.00, 437.62, 97.06, 84.09, 85.12 and 88.86. Four CC value is lowest, therefore Dudhahi is under Four CC regions.

Sewarahi

Wheat 28.20, rice 26.00, sugarcane 18.80, pulses 10.20, oilseeds 9.00 and vegetables 7.80. This is the descending order of cropping percentage area and according to this the calculation of CC of Sewarahi block are as follows. Values of different CCs in Sewarahi block are – 5155.24, 525.62, 97.06,

67.18, 64.34 and 67.32. Five CC value is lowest, therefore Sewarahi is under Five CC regions.

Conclusion

The distribution maps of individual crops are interesting and useful for planners, but it is even more important to view the integrated assemblage of the various crops grown in an area unit. For example, the demarcation of India into the rice region or wheat region does not explain the agriculturally significant fact that very often the wheat region also has a rice crop and vice versa, or wheat is often grown with gram, barley, mustard, lentil, peas and rapeseed. For a comprehensive and clear understanding of the agricultural mosaic of an agro-climatic region and for the planning and development of its agriculture, a systematic study of crop combinations is of great significance. In recent years the concept of crop combination has engaged the attention of geographers and agricultural land use planners. The studies made so far in this field range in approach from topical to regional and vary in extent from small areas of minor political units to the entire country. Firstly Doi's formula has been applied for delineating CC regions. The CC study analysis has been conducted on the basis of crop tabulation. According to the above descriptions. Kushinagar region/district has divided into three CC regions, according to above calculation Fig. 02.

The arbitrary choice method and some of the quantitative techniques used in the delineations of crop combinations have been illustrated by taking the district Kushinagar of Uttar Pradesh as the area of study. In Kushinagar, the cultivation of crops is the dominant economic activity of the total reporting area of about 35 million hectares, some 19 million hectares represent the net sown area, i.e., about 55 per cent as compared to 47 per cent for the whole of India. In order of area covered, the most important crops are rice, wheat, gram, sugarcane, barley, oilseeds, vegetables, maize, bajra and jwar. These crops occupy about 96 per cent of the net cropped area but because of double cropping their total area actually represent 80 per cent of the gross cropped area. Crops occupying less than two per cent of the gross cultivated area have not been included as they occupy an insignificant area. The agricultural statistics relate to the district unit and are the averages of five years (1990-95). As described earlier, the first or first two or first three crops, occupying the major area of the gross cropped land, are selected on the basis of their areal strength, i.e., area occupied by each one of them in a given year.

Crop Combination Regions

Three Crop Combination Regions

This is formed by wheat-rice-sugarcane and it occupies Motichak, Captanganj, Ramkola and Khaddha block as a combinational island. Nebua Naurangiya block having four CC disturbs the uniformity of three CC regions. Wheat is a uniform and essential food grain throughout the study region. The region of two CC can be safely called as wheat-rice or wheat-sugarcane or rice-vegetables region; but it is not in this region. The three CC regions is a

Periodic Research

traditional wheat-rice-sugarcane core, where it is ecologically as well as economically highly suited. The wheat-rice-sugarcane and related resource may be utilized on much more profit level provided the raw product for local processing units.

Four Crop Combination Regions

Sukrauli, Hata, Nebua Naurangiya, Bishunpura, Tamkuhi and Dudhahi blocks are the representative. The Four CC is a representative of commercial and food crops cultivation in Kushinagar region. Environs in brief, the CC of this region is supplementary and complementary of four CC regions. It is generally a wheat-rice-sugarcane-pulses region with an addition of vegetables-oilseeds in Sukrauli and Tamkuhi blocks. In Hata block sugarcane farming is dominant after Captanganj and Searahi in the region under four CC. The nature of the CC of the region encourages the vegetables and sugarcane and its associated agro economic activities in these blocks. In this area wheat-rice-sugarcane-pulses complex needed to be intensified and strengthened for the further integrated development of the region through agriculture.

Five Crop Combination Regions

Searahi block stands as a representative of five CC; rice-wheat-sugarcane-pulse- oilseeds is the CC of this block. A district peripheral belt of intensive and extensive sugarcane and fruit cultivation has recently develop around and inside the block and sugarcane farming although survives to some extent in blocks environment, but it has been intensive towards rural peripheries. Padrauna, Kasia, Fazilnagar and Searahi are the blocks, which occupies the five crop-combination region. The five CC of Fazilnagar pose a pertinent question whether the crop cultivation is diversified or specialized under rural (backward) influences, when agriculture tends towards commercialization and industrialization.

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Location of Kushinagar in Uttar Pradesh (INDIA)

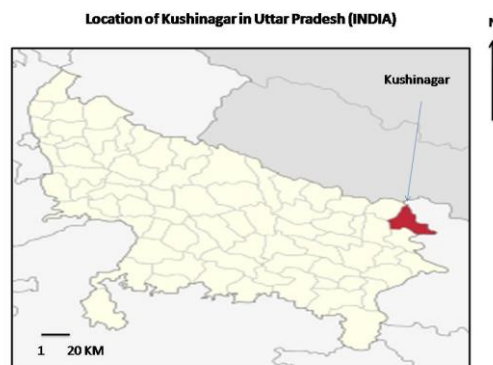


Fig.01

Crop-Combination Region of Kushinagar

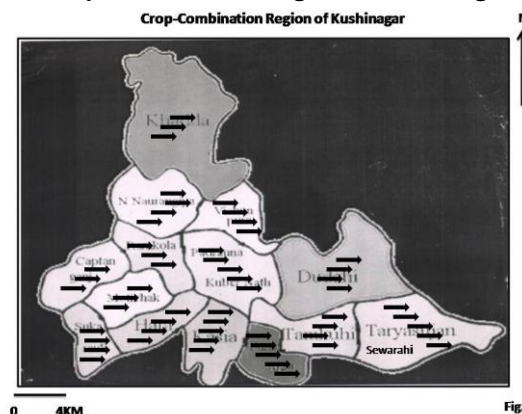


Fig.03